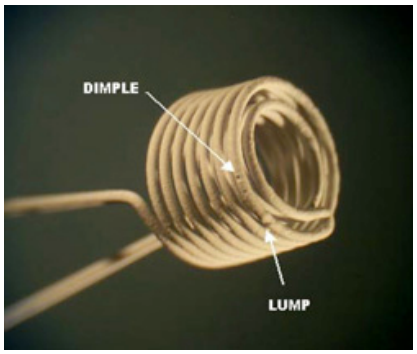
Supply Chain Viability for the US Microwave Power Tube Industry



Microwave Power Tubes (MPTs) are of critical concern to the Department of Defense (DoD) because of their extensive use in military weapon systems and the limited number of suppliers who can provide the necessary materials and components to produce these high-frequency, high power amplification devices. Many of the critical suppliers are small businesses with insufficient market incentive for them to invest or improve business practices. The DoD Defense Production (DPA) Act Title III program sponsored this project in response to a critical supply base issue with the objective of strengthening the supplier base to ensure it's future viability.

Continued on Story 1

Laser Material Process Database for Cutting/Welding

The MTIAC Laser Process Database, developed under sponsorship of DTIC, is now available in Windows™ format and is being sold worldwide. This MTIAC product is designed to help the user determine the appropriate cutting/welding parameters used for manufacturing a wide variety of metallics and non-metallics at various thicknesses using either a CO2 or Nd-YAG laser beam. One of the key features of interest is the ability to use this product as the foundation for developing internal, customized manufacturing parameters, and the brief discussion it provides of a theoretical laser cutting model and a theoretical laser welding model.

Continued on Story 2

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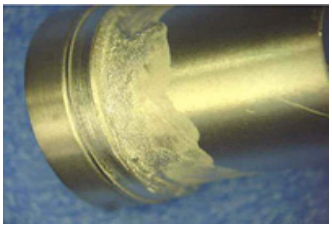
Selection of the materials and components to be addressed was based on criticality, probability for success within the near-term, and available funding. The products chosen for inclusion in this program were helix tape, heater filaments, and cathodes. IIT Research Institute (IITRI) led the project team and four subtier suppliers participated. They are Semicon Associates, (a subsidiary of Ceradyne, Inc.) and Spectra-Mat, Inc. (SMI), both cathode producers; H. Cross Company, sole manufacturer of helix tape; andUnion City Filament (UCF) Corporation, the only independent producer of cathode heater filaments. Boeing Electron Dynamic Devices (EDD), Communication and Power Industries (CPI), and Northrop Grumman Electronic Systems, three of the industry's major MPT producers, served as technical advisors.



This task sought to resolve not only general, industry-wide issues, but company specific problems as well. The primary objectives of Semicon Associates and Spectra-Mat were to provide materials and services of escalating complexity, uniformity, reliability, and value to the MPT manufacturing community. The primary objectives of both Union City Filament and H. Cross were to formally qualify alternative sources of raw material in order to mitigate production delays and yield.

Each of the four companies made major advancements in their technical capabilities and business practices. In addition, each company developed a strategic business plan, a marketing plan, developed a website, and conducted a demonstration/ briefing of the achievements of their specific program to not only the project team, but many of their key customers as well.

The overall benefits and implications to DoD can be summarized as follows:

- Reduced risk to DoD of production shortfalls;
- A more responsive supply base, especially for meeting military "surge" requirements;
- Reduced risk of losing the manufacturing process knowledge for these components;
- Lower cost due too simplification of some processes;
- Strategic marketing is enhancing the overall business viability of the four suppliers, especially in recent economic uncertainty; and
- The adaptation of modern manufacturing engineering tools will position this segment of the supply chain to meet not only the needs of DoD today, but in the future as well.

A major achievement was development of two engineering specifications that define processing and final acceptance criteria for dispenser cathodes and cathode heaters (filaments). Prior to this MTIAC task, the industry did not have specifications or standards that sufficiently defined their performance requirements. A key benefit of standardizing criteria among the MPT producers is cost containment through less material review and scrap. The industry and respective suppliers immediately began to use these specifications. The Naval Surface Warfare Center (NSWC), Crane Division maintains the documents and the Electronic Components, Assemblies, and Materials Association (ECA) of the Electronics Industries Alliance have taken ownership of the documents for the long-term.

Collectively, this work has resulted in business and manufacturing process improvements that made these companies stronger and advanced the state of manufacturing in the MPT supply chain. As a result of the investment made by DOD, the military supply base for cathodes, helix tape, and heater filaments is a stronger and more viable business base.

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